Jenkins CI/CD for a Static Web App — Case Study

End-to-end CI/CD with Docker deployment | Punith C | Nov 13, 2025

Executive Summary

- Goal: Automate build → test → deploy for a static site
- Pipeline: Checkout, Build, Test, Deploy (4/4 green)
- Deployment: Docker (nginx) on port 8090
- Result: 100% success; ~15s from commit to running app

Problem Statement & Objectives

- Build a CI/CD pipeline for a static website (HTML/CSS/JS)
- Automated validation and reliable deployment
- Use Jenkins Declarative Pipeline
- Prefer Docker for reproducibility

Architecture Overview

- Flow: Developer (GitHub) → Jenkins → Docker Image → Nginx Container → Browser
- Environment: Windows host + WSL2 Ubuntu agent
- Base image: nginx:alpine

Technologies Used

- HTML5, CSS3, JavaScript
- Nginx (nginx:alpine)
- Docker
- Jenkins (Declarative)
- Git/GitHub

Tools & Environment

- Jenkins 2.528.2, Docker 28.2.2, Git 2.43.0

- Windows + WSL2 (Ubuntu 24.04)

- VS Code; PowerShell + bash

- Optional: docker-compose

Repository & Files

- App: index.html, styles.css, script.js
- Pipeline: Jenkinsfile (Declarative)
- Container: Dockerfile, docker-compose.yml
- Scripts: validate.sh, deploy.sh (alt method)
- Docs: README, CASE-STUDY-SUMMARY, DEPLOYMENT-GUIDE

Pipeline Design (Stages)

- Checkout → Build (validate.sh) → Test (validate.sh) → Deploy (docker build/run)

- Env: DEPLOY_METHOD=docker, CONTAINER_NAME=simple-webapp-demo, WEBAPP_PORT=8090

- dir() wrappers handle nested repo path

Implementation Steps

- Setup repo, scripts; push to GitHub

- Configure Jenkins (Pipeline from SCM; correct script path)

- chmod +x scripts; ensure Docker access for Jenkins

- Pre-pull nginx:alpine to avoid timeouts

Deployment Approach (Docker)

- Build image: simple-webapp:latest
- Container: simple-webapp-demo (8090→80)
- Stop/remove old container automatically
- Post actions verify container health and URL

Results & Metrics

- Build #10: SUCCESS (4/4 stages), ~15s total
- Image ID: e54b76dbdf5f; Container ID: 1db05a33b511
- URL: http://localhost:8090
- JS alert verified: 'Hello from the Simple WebApp Jenkins CI/CD demo!'

Challenges & Resolutions

- Jenkinsfile path in nested dir → set Script Path + use dir()
- Script permissions → git chmod + pipeline chmod
- Docker permission denied → add Jenkins to docker group + restart
- Image pull timeout → pre-cache nginx:alpine
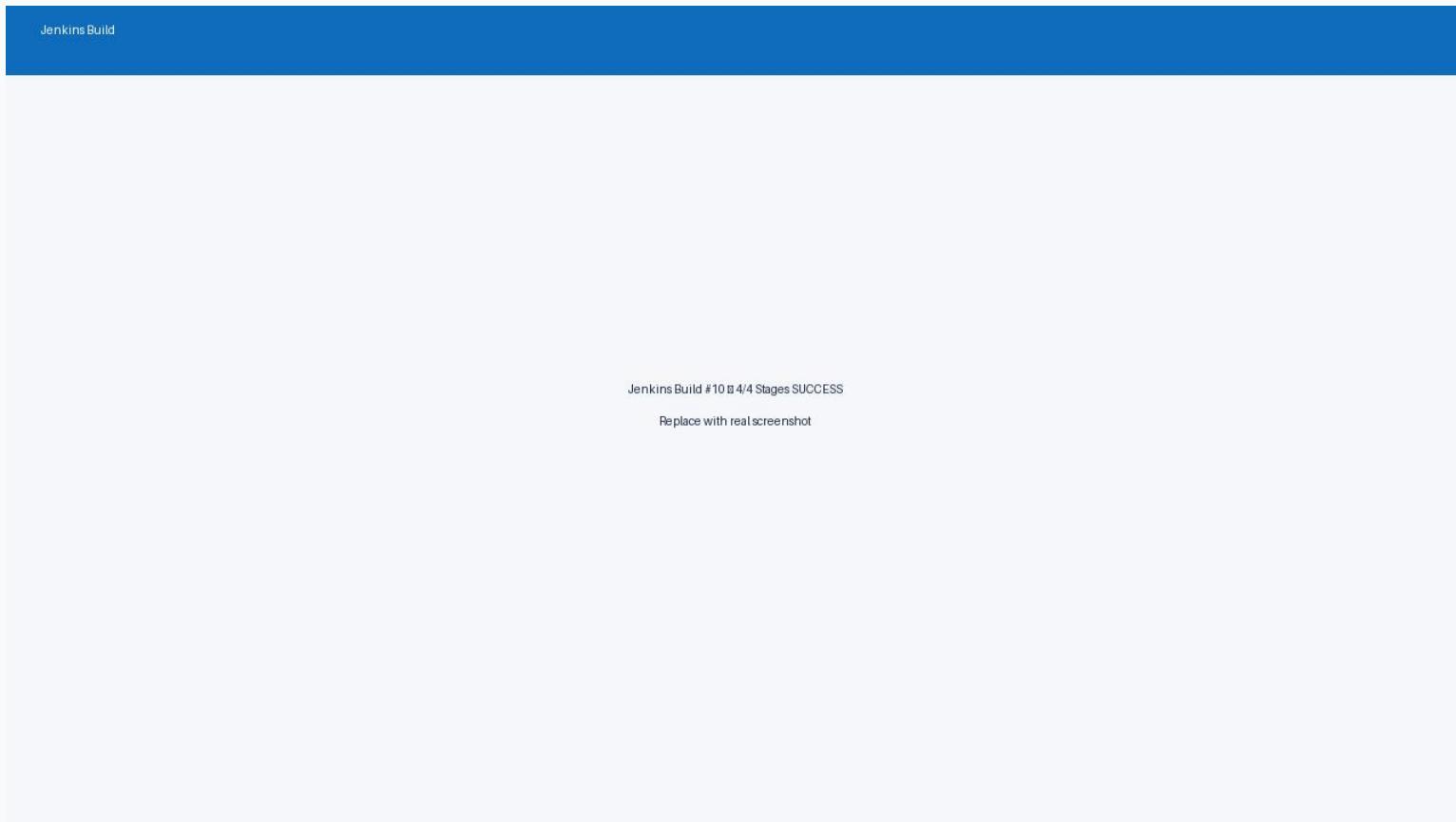- Deploy method → switched from sudo copy to Docker

Lessons Learned

- Docker simplifies deployments in CI/CD
- Repo structure impacts Jenkins configuration
- Windows→Linux: scripts need executable bits
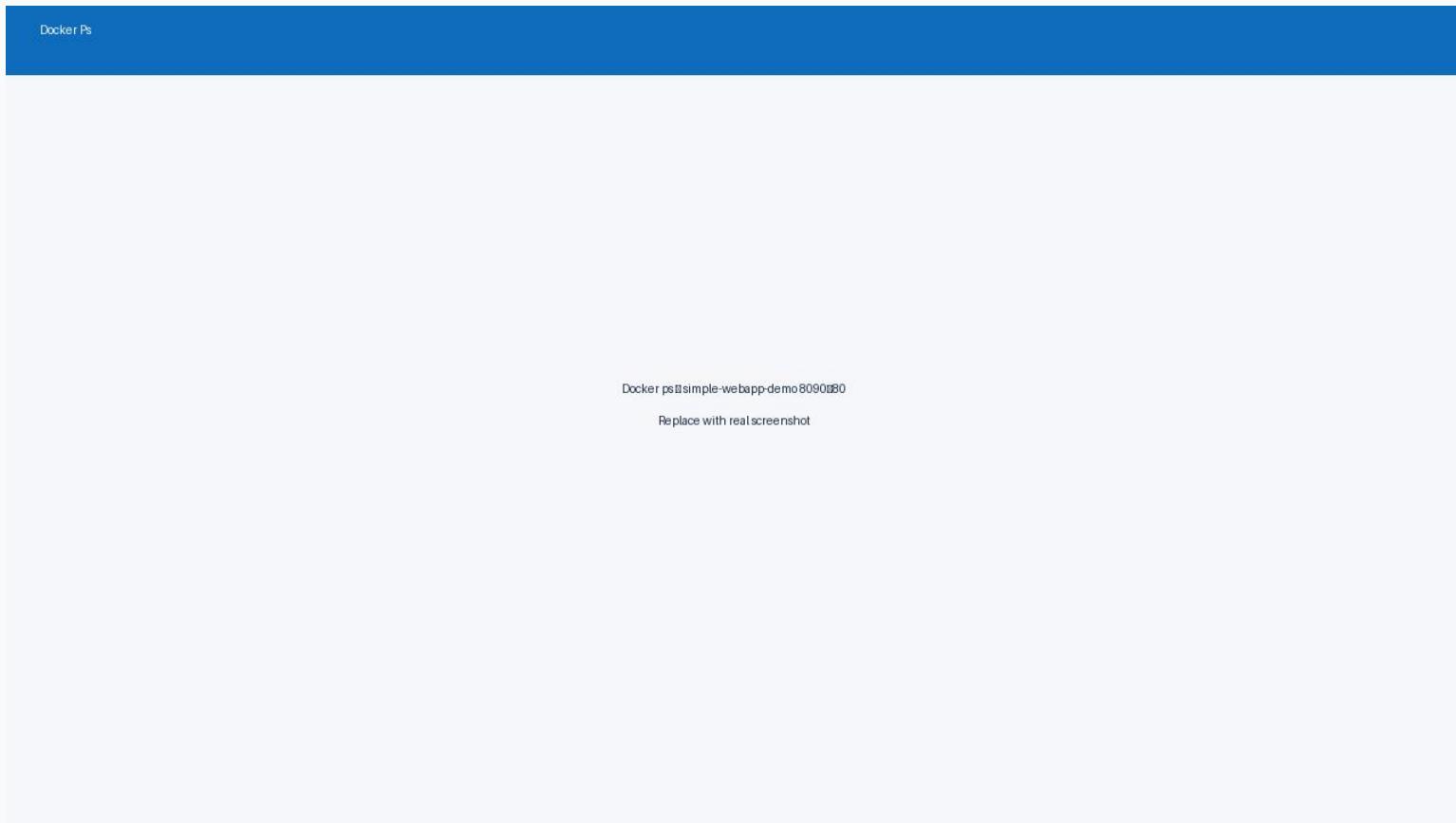- Group membership changes require service restart

Next Steps (Enhancements)

- UI tests with Playwright/Puppeteer

- Push images to registry; tag by build number

- Blue/green or canary deployments

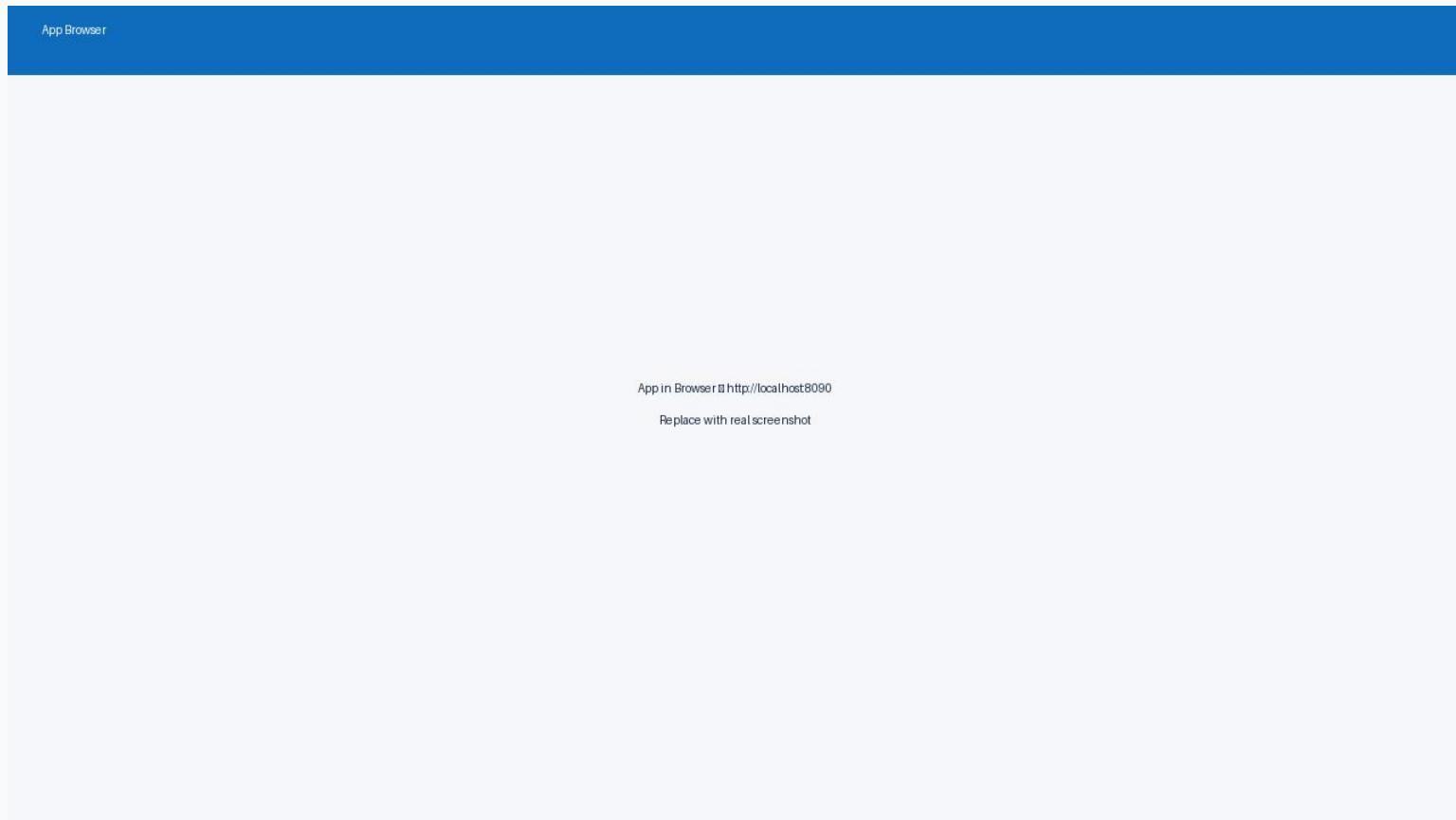- Webhook triggers; Slack/Email notifications

Screenshot: Jenkins Build #10

Jenkins Build

Jenkins Build #10 ▯ 4/4 Stages SUCCESS

Replace with real screenshot

Screenshot: Docker Container (8090→80)

Docker Ps

Docker ps simple-webapp-demo 8090:80

Replace with real screenshot

Screenshot: App at http://localhost:8090

App Browser

App in Browser @ http://localhost:8090

Replace with real screenshot

Thank You

- Repo: https://github.com/Punith968/simple-webapp-jenkins-ci-cd
- Questions welcome